United States Environmental Protection Agency

Solid Waste and Emergency Response (5306W)

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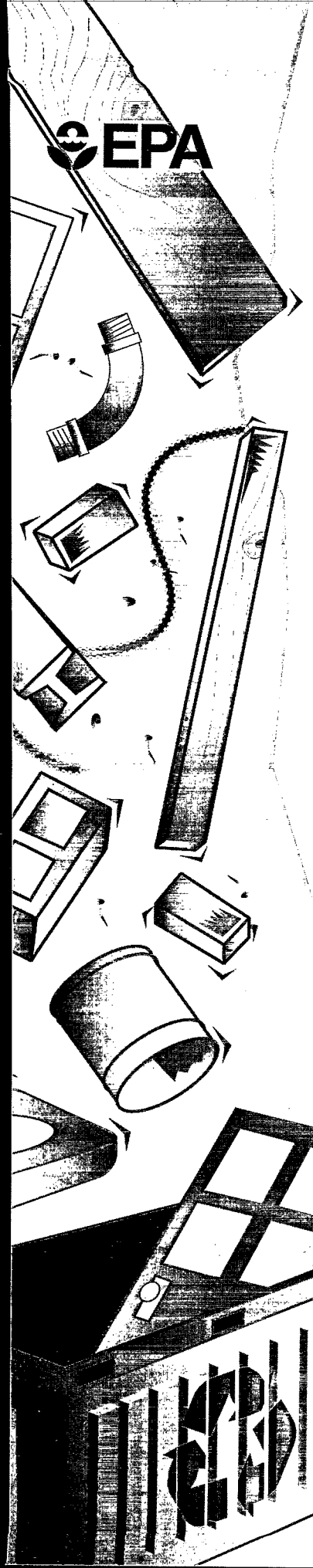



# Four Times Square

## New York, New York

### 58% Reduction of Demolition and Construction Materials

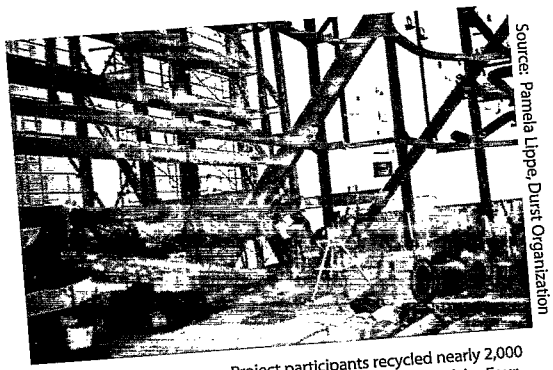

*As of its fifth quarter of construction, the Four Times Square office tower project has demonstrated that materials recovery makes good sense and can save money. By March 1999, project participants had diverted an average 58% of total demolition and construction discards (59% by weight of demolition debris and, so far, 58% by weight of construction discards) from disposal. Contractors saved over $780,000 in disposal fees and earned over $105,000 in revenue from materials sales by diverting 17,800 tons of materials from disposal.*

## Project Description

Four Times Square is a 48-story office tower located at the intersection of Broadway and 42nd Street. It is the first office tower to be built in Manhattan since 1988. It is also, due to the commitment of its owners, one of the first office towers of its size designed to address environmental building issues, such as energy efficiency and indoor air quality. The implementation of responsible construction techniques led to the recovery of 58% of overall demolition and construction debris.

The project involved both a demolition phase and a construction phase. Before construction could begin, crews had to remove six buildings. Extensive salvage combined with recycling resulted in the recovery of over 15,000 tons of materials. Prior to demolition, private groups removed all salvageable materials such as doors, copper facial corners, and 112 tons of wood beams. As the structures were removed, the waste hauler carted away over 15,800 tons of metal and rubble for recycling, and the demolition contractor disposed of almost 11,100 tons of materials including unsalvageable bricks and commingled wood, insulation, and gypsum board.

To assure that materials were recovered during the construction phase, project coordinators worked closely with the demolition contractor and required it to report tonnage data on materials recycled or reused. Prior to construction, the owners, principal architects, and construction manager held a pre-construction meeting with the construction contractors to discuss the importance of materials efficiency and recovery. The environmental consultant adjusted the contract to include language that maximized recovery. She also created forms that contractors could use to anticipate packaging waste



Source: Pamela Lippe, Durst Organization

Project participants recycled nearly 2,000 tons during the construction of the Four Times Square building.

**Materials Collected**

Recycled
(Demolition) steel, scrap metal, brick, concrete, dirt, (Construction) aluminum, miscellaneous metal, cardboard, wood, dirt, and rock

Salvaged for Reuse
ornate stone work, office doors, copper facial corners, and wood timbers.

generated during the construction process. The construction management firm threatened to withhold payments unless the contractors adhered to the contract and completed the forms. Although some contractors were reluctant to complete the forms, no payments were withheld. By the fifth quarter of construction (March 1999), the contractor had recovered 1,900 tons of the construction debris generated.

There was little room to sort and collect recyclables, no space to place drop-off containers, and no room for multiple trucks to pick up materials for recovery or disposal at the construction site. Hoist and elevator operators, busy performing construction tasks, had little time to make multiple trips to move recyclables. Instead the contractor practiced "post-collection recycling" by having all debris hauled to a central site and then sorted.

In addition to recovering materials for reuse and recycling, contractors practiced source reduction during the project. Contractors reduced waste by requiring suppliers to reduce packaging or use durable packaging and by returning some packaging, such as pallets, to suppliers.

## Project Summary

| | |
|---|---|
| **Date Started** | August 1996 |
| **Projected Date of Completion** | July 1999 |
| **Project Square Footage** | |
| Demolition | 462,500 |
| Construction | 1,600,000 |
| **Total Waste Generated (Tons)** | **30,314** |
| Demolition | 27,027 |
| Construction | 3,287 |
| **Disposed (Tons)** | **12,480** |
| Demolition | 11,097 |
| Construction | 1,383 |
| **Total Materials Diverted (Tons)** | **17,833** |
| *Recycled* | |
| Demolition | 15,805 |
| Construction | 1,904 |
| *Salvaged* | |
| Demolition | 125 |
| Construction | 0 |
| **Total Materials Diverted** | **58.4%** |
| Demolition | 58.9% |
| Construction | 57.9% |
| **Disposal Costs ($/ton)** | |
| Landfill | $44 |
| **Revenue/Savings from Demolition Materials Diversion** | |
| Planning and Labor Costs | NA |
| Tip Fees for Recyclables | NA |
| Revenue from Materials Sales | $92,375 |
| Value of Materials Salvaged | $12,500 |
| Savings from Avoided Disposal | $700,920 |
| **Revenue / Savings from Construction Materials Diversion** | |
| Planning and Labor Costs | NA |
| Tip Fees for Recyclables | NA |
| Savings from Avoided Disposal | $83,755 |
| **Total (Savings) from Diversion** | **NA** |

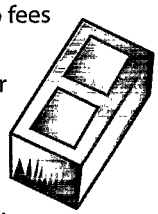
Key: NA = not available.

Notes: Data reflects figures as of March 1999, before construction was complete. Contractors received all revenue from materials sales. Hauling costs for materials landfilled were not available. Materials diversion through source reduction is not reflected in the percentage of materials diverted.

Source: Institute for Local Self-Reliance, Pamela Lippe, and Mel Ruffini, 1999

## Costs/Benefits

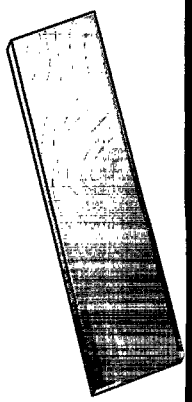
The project contractor realized all savings resulting from materials recovery. The building owners chose to use the possibility of savings as an incentive to encourage recovery and lower contract costs rather than collect the savings themselves. Although cost data attributed to materials recovery are unavailable, the environmental consultant reported that the materials recovery was cost-effective. Disposal tip fees of $44 per ton saved the demolition contractor over $700,000 in avoided disposal costs and the construction contractor over $83,000 from avoided disposal as of March 1999. When combined with the revenue received from the sale of steel and scrap metal ($92,375), wood beams ($7,500), and other salvaged materials ($5,000), the demolition contractor believes these savings far outweighed waste reduction costs for planning, additional labor, and tip fees for recycled materials. The planning and development costs included the fees of the environmental consultant for writing additions to contracts, creating materials tracking forms, organizing team meetings, and overseeing all materials recovery efforts.



Project facilitators considered post-collection recycling the most cost-effective materials recovery technique, because on-site labor was very expensive.

## Tips for Replication

- Obtain instructions from the top and communicate them to all project participants.
- Educate contractors about materials recovery techniques and the importance of resource conservation. Ask for their help.
- Ask contractors to avoid generating waste by using reusable containers and requesting materials with reduced packaging.
- Require contractors to estimate waste generated on site, including packaging, so you can anticipate the nature and amount of the recyclable materials that will be generated on site.
- Encourage communication among the client, project facilitators, and contractors.



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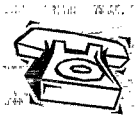

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